

WHAT IS CLAIMED IS:

Sub B37 1. A method for manufacturing a pneumatic tire in which a green tire having tire components assembled is charged in a mold for vulcanization-molding and lug grooves are formed on a tire tread surface, said method including previously forming carved grooves at positions on a surface of said green tire corresponding to said lug grooves extending in substantially the same direction as said lug grooves.

Sub D' 2. A method for manufacturing a pneumatic tire as claimed in claim 1, wherein said carved groove is carved in a shape opened from a tread center side to a tread end.

3. A method for manufacturing a pneumatic tire as claimed in claim 2, wherein said carved groove is carved in a shape opened from a neighborhood of a closed end point of said lug groove to said tread end.

4. A method for manufacturing a pneumatic tire as claimed in claim 3, wherein said closed end point of said lug groove is distant from a tread center by a distance larger than 0.1 times of a tread width.

a 5. A method for manufacturing a pneumatic tire as claimed in claim 1, ~~2, 3 or 4~~, wherein a main part of said lug groove is inclined with regard to axis of the tire at an angle of 5 degrees and more and 45 degrees and less.

6. A method for manufacturing a pneumatic tire as claimed in claim 1, wherein said carved groove is carved in a shape opened from one tread end to another tread end.

7. A method for manufacturing a pneumatic tire as claimed in claim 1, wherein said carved groove is carved in a shape opened from a tread center side to a tread end gradually widening.

Sub C37 8. A method for manufacturing a pneumatic tire as claimed in claim 7, wherein said carved groove having the shape gradually widening is formed by carrying out the carving twice using a cutter.

Sub E' 9. A method for manufacturing a pneumatic tire as

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claimed in claim 6, ~~7 or 8~~, wherein said carved groove is carved along direction of said lug groove and along direction of axis of the tire from or toward a neighborhood of said closed end point of said lug groove.

10. A method for manufacturing a pneumatic tire as claimed in claim 1, wherein volume of said carved groove is 0.4 - 1.2 times of volume of said lug groove.

11. A method for manufacturing a pneumatic tire as claimed in claim 10, wherein volume of said carved groove is 0.7 - 1.0 times of volume of said lug groove.

12. A method for manufacturing a pneumatic tire as claimed in claim 10, wherein depth of said carved groove is 0.5 - 0.9 times of depth of said lug groove.

13. A method for manufacturing a pneumatic tire as claimed in claim 1, wherein said tire components include a belt member having a relatively low expansion rate.

Sub B 14. A method for manufacturing a pneumatic tire as claimed in claim 13, wherein expansion rate of said belt member is 3% and less.

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15. A method for manufacturing a pneumatic tire as claimed in claim 1 ~~or 13~~, wherein a full-mold vulcanization-molding machine having an upper mold and a lower mold is used as a mold for vulcanizing and molding said green tire.

Sub D 16. A method for manufacturing a pneumatic tire as claimed in claim 15, wherein lug groove ribs on said upper and lower molds are fitted in said carved groove of said green tire when said green tire is charged in said full-mold vulcanization-molding machine.

Sub E 17. A method for manufacturing a pneumatic tire, comprising: a step of manufacturing a green tire in which ribbon-like or sheet-like extruded rubber is piled up on a ply and a belt member assembled on a drum to form a tread; a step of forming a carved groove on a tread surface of said green tire in direction of a lug groove; and a step of charging said green tire formed with said carved groove in a vulcanization-molding

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machine to carry out vulcanization-molding.

18. An apparatus for manufacturing a pneumatic tire which is a full-mold vulcanization-molding machine having an upper mold and a lower mold each provided with lug groove ribs, and guide means provided on said molds for letting said lug groove ribs fit to a carved groove formed on a green tire when said green tire is charged in said full-mold vulcanization-molding machine.

add pb

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